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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/098,713

03/15/2002

Kevin D. MacLean

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NUMERICAL C/O PARK
VAUGHAN & FLEMING LLP
SUITE 201
508 SECOND STREET
DAVIS, CA 95616-4692

EXAMINER

KIK, PHALLAKA

ART UNIT

PAPER NUMBER

2825

DATE MAILED: 02/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/098,713

Applicant(s)

MACLEAN ET AL.

Examiner

Phallaka Kik

Art Unit

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AW

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-10, 12-17 and 19-26 is/are rejected.
- 7) ☒ Claim(s) 4, 11, 18 and 27 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 March 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2,3.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: ____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: the referenced co-pending application lacks number and filing date (page 1, paragraph 1 of specification).

Appropriate correction is required.

Claim Objections

2. **Claims 1-7,9,12-13,16,18-21,25-27** are objected to because of the following informalities:

As per **claim 1**, --,-- (coma) should be inserted after "cells" (line 2).

As per **claim 2**, "the complete" (both occurrences in lines 2 and 3) should be --a complete-- for proper antecedent basis.

As per **claim 5**, "considering the target cell" (line 1) should be--said determining-- for further clarification; "can be" (line 4) should be --is-- to clearly identify what is being claimed.

As per **claim 6**, "can be" (line 2) should be --are-- to clearly identify what is being claimed.

As per **claims 2-7**, the claims are objected to for incorporating the above errors into the respective claims by claim dependency.

As per **claim 9**, "the complete" (both occurrences in lines 3 and 4) should be --a complete-- for proper antecedent basis.

As per **claim 12**, "considering the target cell" (line 2) should be --said determining-- for greater clarification; "can be" (line 4) should be --is-- to clearly identify what is being claimed.

As per **claim 13**, "can be" (line 3) should be --are-- to clearly identify what is being claimed. The claim is also objected to for incorporating the above error into the claim by claim dependency.

As per **claim 16**, "the complete" (both occurrences in lines 3 and 4) should be --a complete-- for proper antecedent basis.

As per **claim 18**, --to-- should be inserted after "configured" (line 2) for proper grammar.

As per **claim 19**, "can be" (line 4) should be --is-- to clearly identify what is being claimed.

As per **claim 20**, "can be" (line 3) should be --are-- to clearly identify what is being claimed.

As per **claims 20-21**, the claims are also objected to for incorporating the above error into the respective claims by claim dependency.

As per **claim 25**, "layout" (line 7) should be --layouts-- since they refer to both the first and second layouts; --if the determination indicates the respective portions of the layouts are not identical,-- should be inserted before "performing" (line 10) for further clarification.

As per **claims 26-27**, the claims are objected to for incorporating the above error into the respective claim by claim dependency.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. **Claims 1-3,5-6,8-10,12-13,15-17,19-20,23** are rejected under 35 U.S.C. 102(b) as being anticipated by **Aubel et al.** (US Patent No. 5,696,693).

As per **claims 1,8,15,23**, all of the elements of the claims are illustrated in Figs. 4A and 4B, and are described in col. 11, line 15 to col. 12, line 54, wherein comparison by analogy of the target cell(s) and source cell(s) (e.g., represented as nodes of graphs or source list and target list--corresponding to hash codes) corresponds to the determining/comparison mechanism, wherein the matched/identical (i.e., analogous) cell is placed in blocks 62,80 of Fig. 4B (see col. 11, lines 45-51) and the continued processing of the target cell to find the solution correspond to the return to block 40 of Fig. 4A and block 95 of Fig. 4B, wherein the computer-readable medium and

instructions are part of the CAD system as described in col. 9, line 32 to col. 10, line 31, resulting in the integrated circuit.

As per **claims 2-3,9-10,16-17**, all of the elements of claims the complete layout of the target cell and preceding/source cell considered corresponds to the whole structure of the target cell and source cell (i.e., parent node as well as child nodes which are adjacent or surrounding the parent node--col. 11, lines 27-35).

As per **claims 5,6,12,13,19,20**, the receiving of the specification layout is shown in Fig. 3 (e.g., blocks 24 and 46 are accessed in order to find matching cells in block 44) and dividing of the cells is part of the logic hierarchy for which the cells are organized and sorted into their sub-parts which can be used for independent processing (col. 11, lines 3-6, 26-30; col. 13, lines 49-61).

5. **Claims 1-3,5,7-10,12,14-17,19,21-23** are rejected under 35 U.S.C. 102(b) as being anticipated by **Cobb et al.**, (WO 00/67074 A1).

As per **claims 1,8,15,23**, all of the elements of the claims are illustrated in Fig. 5 (see also pages 6-7), wherein the determining step/means correspond to block 506, the using of the previously calculated position corresponds to block 508, and the processing of the target cell when the target cell is not identical to the preceding cell corresponds to blocks 510-514, wherein the target and preceding cells correspond to the windowed area and previous windowed area, respectively, since Applicant's specification defines "cell" as referring to "a unit of design, such as an arbitrary geometric region or portion of the layout" (page 4, lines 7-9) and wherein "hash code" is defined in Applicant's specification as "identifier" and is meant to refer to values computed from properties

and/or descriptions of the cells" (page 7, lines 4-7) to which the equivalency analysis of **Cobb et al.** uses (page 7, lines 32-45), wherein the computer-readable medium and instructions are part of the EDA tool/system as described Figs. 6-7, resulting in the integrated circuit.

As per **claims 2-3,9-10,16-17**, the complete layout of the target cell and preceding/source cell, including the surrounding area, considered corresponds to the windowed areas (page 6, lines 21-35).

As per **claims 5,12,19**, the receiving of the specification layout and dividing of the cells are also illustrated in block 502 of Fig. 5 (see also page 4, last paragraph) to which the cells can be individually or independently processed.

As per **claims 7,14,21**, the processing of the target cell involves at least the model-based optical proximity correction simulation (abstract).

As per **claim 22**, **Cobb et al.** teach all of the steps of the claim as discussed in the rejection of claims 1,18,23 above, wherein the creation of the mask to be used in lithography process is also illustrated in Fig. 1 and page 1.

6. **Claim 24** is rejected under 35 U.S.C. 102(e) as being anticipated by **Lin** (US Patent Application Publication No. 2002/0152449).

As per **claim 24**, all of the elements of the claims are discussed in page 4, paragraph [0071], wherein the layout being inputted is described in page 3, paragraphs [0056]-[0057] to generate the instance-based representation in which the partitioning/dividing into tasks/jobs take place for parallel processing (i.e., distributing

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the jobs across a plurality of processors) for performing optical proximity correction, as part of the preparation of mask data as illustrated in Fig. 6.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. **Claims 6,13,20** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Cobb et al.** (WO 00/67074 A1) in view of **Lin** (US Patent Application Publication No. 2002/0152449).

As per **claims 6,13,20**, **Cobb et al.** disclose all of the elements of claims 5,12,19 as discussed previously. However, **Cobb et al.** failed to teach the distribution of the cells (e.g., areas or windowed areas) to a set of parallel processors so that the cells are processed in parallel. Such parallel processing of cells are taught in **Lin** to prepare mask data more efficiently (page 4, paragraph [0071], [0056]-[0057]). It would have been obvious to one of ordinary skilled in the art at the time of the invention to further incorporate the parallel processing of **Lin** into the method/system of **Cobb et al.** because such a combination would further speed up the processing of IC mask by taking advantage of power of parallel processing of **Lin** and avoiding un-necessary computer-intensive processing of identical cells/areas as taught by **Cobb et al.**.

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9. **Claims 25-26** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Lin** (US Patent Application Publication No. 2002/0152449) in view of **Cobb et al.** (WO 00/67074 A1).

As per **claims 25-26**, **Lin** discloses all of the elements of claim 24, which the claims depend as discussed previously. However, **Lin** fails to make use of the steps/means for using the previously calculated solution of the first job (i.e., previous job) for the second/current job if it is determined that the portion of the layout of the second or current job is identical to the portion of the layout of previous/first job. Such a method/system is taught by **Cobb et al.** to provide the desired improved accuracy while reducing computational burden by avoiding redundant processing (i.e., providing faster processing) (page 2, lines 20-23; Fig. 5; see rejection of claims 1,18,15 above). It would have been obvious to one of ordinary skilled in the art at the time of the invention to further incorporate the determining/comparison method/system portion of **Cobb et al.** into the parallel processing system/method of **Lin** because such a combination would further results in a much faster processing of the semiconductor mask than would otherwise be possible in using either methods/systems alone.

Allowable Subject Matter

10. **Claims 4,11,18** are objected due to minor informalities and as being dependent upon rejected base claims, but would be allowable if the claims are rewritten in independent form including all of the limitations of the base claim and any intervening claims, and if claims 4,18,27 are also rewritten to overcome the minor informalities indicated above.

11. The following is a statement of reasons for the indication of allowable subject matter:

As per **claims 4,11,18,27**, the claims recite the method/computer-readable storage medium/apparatus for speeding up processing of a layout of an integrated circuit that has been divided into cells and for performing distributed mask data preparation and model-based optical proximity correction, comprising the inventive steps/means for performing an overlap removal operation on the target cell (portion of the layout associated with the first job) and the preceding cell (portion of the layout associated with the second job), prior to determining if the target cell is identical to the preceding cell, as claimed. The prior arts made of record teach various methods/systems of producing circuit layout and creating mask layout, including using overlap removal procedure. However, the prior arts made of record, alone or in combination, failed to teach or suggest the performing of the overlap removal prior to the determining if the target cell is identical to the preceding cell as claimed, and further fail to teach or suggest the benefits of performing such overlap removal process prior to the determining steps/means. Accordingly, the claimed invention is novel and unobvious over the prior art made of record.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Therefore, Applicant is requested herein to consider them carefully in response to this Office Action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phallaka Kik whose telephone number is 571-272-1895. The examiner can normally be reached on Flexitime.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew S. Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any response to this action should be mailed to:

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

or faxed to:

703-872-9318 (for Before-Final) and 703-872-9319 (for After-Final) for formal communications intended for entry,

Or:

(571) 273-1895 (for informal or draft communications, please label


"PROPOSED" or "DRAFT" and let the examiner know prior to faxing).

14. Applicant should note that effective May 1, 2003, the United States Patent and Trademark Office has a new Commissioner for Patents address for transitioning to the new Office location in Alexandria, VA, wherein correspondence in patent-related matters to organizations reporting to the Commissioner for Patents must now be addressed to:

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

PK 
February 21, 2004


MATTHEW SMITH
SUPERVISORY PATENT EXAMINER
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